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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,875	07/16/2001	Takamitsu Asanuma	110108	1757

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EXAMINER

NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 02/01/2002

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/904,875

Applicant(s)
Asanuma et al.

Examiner
Tu M. Nguyen

Art Unit
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Jul 16, 2001 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 20) ☐ Other: _____

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DETAILED ACTION

Drawings

1. The drawings are objected to because in Figures 7A and 7B, labels should be included in these figures. For example, --combustion pressure-- should be included for the vertical axis; -- $A/F = 21$ -- and -- $A/F = 18$ -- should be included in Figures 7A and 7B, respectively. Correction is required.

Specification

2. The abstract of the disclosure is objected to because of the use of open ended phrase "comprise" on lines 11 and 17 of page 46. Correction is required. See MPEP § 608.01(b).
3. The disclosure is objected to because on page 22, line 30, "53" should read --52--. Appropriate correction is required.

Claim Objections

4. Claim 1 is objected to because on line 4 of the claim, "carry" should read --carries--; and line 8 of the claim, "the" should be deleted. Appropriate correction is required.

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Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claims 1, 5, and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Maaseidvaag et al. (U.S. Patent 6,167,696).

Re claims 1 and 5, as shown in Figures 1 and 4, Maaseidvaag et al. disclose a device for purifying the exhaust gas of an internal combustion engine, comprising:

- a particulate filter (22) arranged in the exhaust system, which carries a catalyst (54) (lines 33-39 of column 6) for absorbing and reducing NO_x, the catalyst absorbing NO_x when the air-fuel ratio in the surrounding atmosphere thereof is lean and releasing the absorbed NO_x to purify NO_x by reduction when the air-fuel ratio is stoichiometric or rich; and

- a catalytic apparatus (16) having an oxidation function for purifying NO_x arranged in the exhaust system upstream the particulate filter.

Re claim 6, in the device of Maaseidvaag et al., the particulate filter (22) carries an oxygen absorbing agent (the precious metals platinum and rhodium carried by the particulate filter (22) are oxygen absorbing and releasing agents).

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Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshima et al. (U.S. Patent 5,473,890) in view of Maaseidvaag et al.

Re claim 1, as shown in Figure 23, Takeshima et al. disclose a device for purifying the exhaust gas of an internal combustion engine, comprising:

- a NO_x absorber (19) arranged in the exhaust system, which carries a catalyst (platinum) and at least an alkali metal (lines 30-55 of column 4) for absorbing and reducing NO_x, the catalyst and the alkali metal absorbing NO_x when the air-fuel ratio in the surrounding atmosphere thereof is lean and releasing the absorbed NO_x to purify NO_x by reduction when the air-fuel ratio is stoichiometric or rich; and

- a catalytic apparatus (18) having an oxidation function for purifying NO_x arranged in the exhaust system upstream the NO_x absorber (since the catalytic apparatus (18) also carries a noble metal (platinum) and at least an alkali metal (barium) as a NO_x and SO_x absorbent material, it is obvious that the catalytic apparatus can also purify NO_x if the exhaust gas is stoichiometric or fuel rich).

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Takeshima et al., however, fail to disclose that the NOx absorber can also function as a particulate filter.

As shown in Figures 1 and 4, Maaseidvaag et al. teach that it is conventional in the art to use a NOx trap (22) that includes an integral particulate filter to trap soot in the exhaust gas. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NOx trap taught by Maaseidvaag et al. in the device of Takeshima et al., since the use thereof would have provided an effective means to eliminate soot from the exhaust gas of internal combustion engines.

Re claim 2, the modified device of Takeshima et al. further comprises bypassing means (27) to make possible the exhaust gas bypass the NOx trap located downstream of the catalytic apparatus (18).

Re claim 3, in the modified device of Takeshima et al., the catalytic apparatus (18) carries the catalyst (platinum, barium) for absorbing and reducing NOx (see lines 36-41 of column 7), and during the recovery process of the SOx pollution of the catalytic apparatus (18), the bypassing means (27) makes the exhaust gas bypass the NOx trap (see Figure 30).

Re claim 4, in the modified device of Takeshima et al., the catalytic apparatus (18) carries the catalyst (platinum, barium) for absorbing and reducing NOx, and immediately after the finishing of the recovery process of the SOx pollution of the catalytic apparatus (18), the bypassing means (27) does not make the exhaust gas bypass the NOx trap and thus the exhaust gas passes through the NOx trap, as clearly shown in Figure 30.

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9. Claims 1-4 are further rejected under 35 U.S.C. 103(a) as being unpatentable over Dou et al. (U.S. Patent Application Publication 2001/0035006) in view of Maaseidvaag et al.

Re claim 1, as depicted in Figure 17, Dou et al. disclose a device for purifying the exhaust gas of an internal combustion engine, comprising:

- a particulate filter (6) arranged in the exhaust system;
- a NOx adsorber (4) carries a catalyst for absorbing and reducing NOx, the catalyst absorbing NOx when the air-fuel ratio in the surrounding atmosphere thereof is lean and releasing the absorbed NOx to purify NOx by reduction when the air-fuel ratio is stoichiometric or rich; and
- a catalytic apparatus (3) having an oxidation function for purifying NOx arranged in the exhaust system upstream the particulate filter (see paragraphs 0041 and 0042).

Dou et al., however, fail to disclose that the particulate filter and the NOx absorber can be combined into one single housing.

As shown in Figures 1 and 4, Maaseidvaag et al. teach that it is conventional in the art to use a NOx trap (22) that includes an integral particulate filter and a NOx absorbent washcoat (54). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have used the NOx trap taught by Maaseidvaag et al. in the device of Dou et al. to replace the particulate filter and the NOx adsorber, since the use thereof would have provided a device with lower complexity since there are fewer attachments required for one housing.

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Re claim 2, the modified device of Dou et al. further comprises bypassing means (5A) to make possible the exhaust gas bypass the NOx trap located downstream of the catalytic apparatus (3).

Re claim 3, in the modified device of Dou et al., the catalytic apparatus (3) carries the catalyst (noble metals, barium) for absorbing and reducing NOx (see paragraph 0039), and during the recovery process of the SOx pollution of the catalytic apparatus, the bypassing means (5A) makes the exhaust gas bypass the NOx trap (see the last 8 lines of paragraph 0062).

Re claim 4, in the modified device of Dou et al., the catalytic apparatus (3) carries the catalyst (noble metals, barium) for absorbing and reducing NOx, and immediately after the finishing of the recovery process of the SOx pollution of the catalytic apparatus, the bypassing means (5A) does not make the exhaust gas bypass the NOx trap and thus the exhaust gas passes through the NOx trap.

Prior Art

10. The IDS (PTO-1449) filed on August 14, 2001 has been considered. An initialized copy is attached hereto.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of six patents.

- Nagai et al. (U.S. Patent 5,709,722) disclose a particulate trap for diesel engine.

- Araki et al. (U.S. Patent 5,850,735) disclose a method for purifying exhaust gas of internal combustion engines.

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- Hirota et al. (U.S. Patent 5,974,791) disclose an exhaust gas purification apparatus for an internal combustion engine.

- Khair et al. (U.S. Patent 6,293,096) disclose a multiple stage after-treatment system.

- Matros et al. (U.S. Patent 6,314,722) disclose a reversible catalyst/particulate filter.

- Hoffmann et al. (U.S. Patent Application Publication 2001/0052232) disclose a method for removing NOx and soot from the lean exhaust gas of an internal combustion engine.

Communication

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (703) 308-2833.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (703) 308-2623. The fax phone number for this group is (703) 308-7763.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1148.

Tu M. Nguyen

TMN

Tu M. Nguyen

January 30, 2002

Patent Examiner

Art Unit 3748

Thomas Denion
THOMAS DENION
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700

Attachment for PTO-948 (Rev. 03/01, or earlier)
6/18/01

The below text replaces the pre-printed text under the heading, "Information on How to Effect Drawing Changes," on the back of the PTO-948 (Rev. 03/01, or earlier) form.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the Notice of Allowability. Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136(a) or (b) for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

Applicant is required to submit the drawing corrections within the time period set in the attached Office communication. See 37 CFR 1.85(a)

Failure to take corrective action within the set period will result in **ABANDONMENT** of the application.